

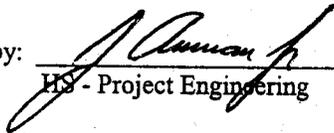
NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE																		
RESTRAINT ASSEMBLY, ITEM 107 ----- 0107-82968-15 (1)	2/2	107FM03 Physical jamming in open position, slide fastener (zipper). Contamination or foreign material in zipper teeth. Nicked, bent or broken chain. Defective stops, defective slider mechanism.	END ITEM: Slide fastener will not close. GFE INTERFACE: Reduced cooling capability. MISSION: Loss of use of one EMU. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Hours. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The LCVG slide fastener (zipper) is fabricated using molded delrin teeth, brass top stops, a die-cast zinc automatic locking slide and polyester fabric for strength and endurance. The top slide fastener stops are clamped through the polyester fabric to prevent the slide from coming loose. The delrin material was selected because of its strength, lubricity and interlocking design which prevents nicks, bends or breaks in the chain. The slide fastener is securely installed with two rows of stitching and the liner is topstitched along the edge of the tape to prevent it from being caught in the teeth. 5/16 inch webbing is bartacked on each side of the zipper chain and acts as a strain relief which prevents the slide from jamming at the bottom stop. During stowage the slide fastener is closed to prevent damage or contamination. B. Test - Acceptance: Component - See Inspection. Certification: The LCVG hardware was successfully tested (manned) during SSA certification to duplicate operational life (Ref. ILC-EM-83-1083). The following usage, reflecting requirements of significance to the LCVG, was documented during certification. <table border="1"> <thead> <tr> <th>Requirement</th> <th>S/AD</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>-----</td> <td>----</td> <td>-----</td> </tr> <tr> <td>Don/Doff</td> <td>98</td> <td>502</td> </tr> </tbody> </table> The LCVG softgoods were successfully tested (manned) during SSA certification to duplicate operational usage (Ref. ILC-EM-98-0008). The following usage reflecting requirements of significance to the LCVG, was documented during certification. <table border="1"> <thead> <tr> <th>Requirement</th> <th>S/AD</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>-----</td> <td>----</td> <td>-----</td> </tr> <tr> <td>Don/Doff</td> <td>98</td> <td>400</td> </tr> </tbody> </table> C. Inspection - Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the hardware received is as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provide traceability information. The following MIP's are performed during the LCVG assembly manufacturing process to assure that the failure causes are precluded from the fabricated item: 1. Inspection of installation for symmetry, neatness, localized buckling of the tape, and smooth operation of the slider. D. Failure History -	Requirement	S/AD	Actual	-----	----	-----	Don/Doff	98	502	Requirement	S/AD	Actual	-----	----	-----	Don/Doff	98	400
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		107FM03		<p>I-EMU-107--012 (3/14/89), Difficulty closing the LCVG zipper due to bent/cracked slider mechanism. Prying slider with screwdriver most probable cause. No corrective action required.</p> <p>I-EMU-107--014 (09/10/91), LCVG zipper would not close due to a torn zipper bead caused by excessive sideways loading of the zipper chain instead of the strain relief strap during donning/doffing. Investigation found that the strain relief strap on the outside of the zipper chain prevented the slider from reaching the bottom chain stop, causing the unbottomed zipper throat and tape bead to react to the side loads and tear. ECO 921-0526 relocates the strain relief strap from the outside to the inside of the LCVG to ensure cross loads are reached by the strain relief strap.</p> <p>E. Ground Turnaround - Inspected per FEMU-R-001, LCVG Pre-Flight Test Requirements, visual inspection.</p> <p>F. Operational Use - Crew Response - Pre/post-EVA : Consider using spare LCVG if available. Otherwise, use tape and/or lacing cord to secure garment. Continue EVA operations. EVA: N/A Special Training - No training specifically covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and systems operational status prior to EVA.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-107 LIQUID COOLING & VENTILATION GARMENT (LCVG)
CRITICAL ITEM LIST (CIL)

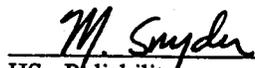
EMU CONTRACT NO. NAS 9-97150

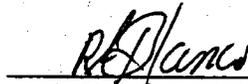
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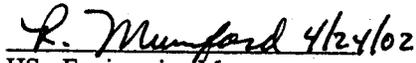

HS - Project Engineering

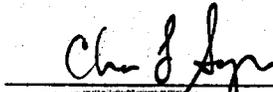
Approved by:


NASA - SSA/SSM

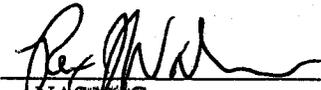

HS - Reliability


NASA - SSA/SSM

 4/24/02
HS - Engineering Manager


NASA - S & MA


NASA - MOD


NASA - Crew

 7/19/02
NASA - Program Manager